Product Manual

IP-HDVR

HDTV Tuner-Digital Video Recorder
Version 2.3 March 23, 2007

Contemporary Research

Table of Contents

Overview

The IP-HDVR HDTV Tuner-DVR is an integrator-friendly HD tuner and Digital Video Recorder (DVR), controllable from Ethernet, RS-232, IR, and onboard Web pages. A universal tuner, the IP-HDVR can receive both ATSC and NTSC broadcasts from twin off-air antenna and cable RF inputs, decode clear-cable digital QAM channels, as well as control an external analog cable box for subscription-based programming. When integrating the IP-HDVR via Ethernet, a control system can also communicate with a video display or projector through the HD tuner's RS-232 control port.

Featuring a 120 GB hard drive, the IP-HDVR is also a powerful HD DVR, able to schedule recording from its TV Guide On Screen™ program guide (no monthly fees) or VCR Plus+ codes. The unit can also record and display digital video from IEEE-1394 ports or upscaled analog video from two AV inputs. In addition, users can pause and review live programs at their leisure.

The tuner displays HD, SD, and analog broadcasts through Component, RGB, DVI, or composite video/S-Video outputs. View up to 2-megapixel quality video in 1080i, 720p, 480p, and 480i modes, in a variety of aspect ratios. Dolby 5.1 surround sound is available from an optical output, and variable- and fixed-level stereo audio ports.

- Receives ATSC HD, SD and NTSC off-air, as well as analog, HD, and unscrambled QAM cable channels simultaneously from TV and Cable RF inputs
- Records tuner and external AV to internal 120 GB hard drive
- Pauses live video programming for delayed playback and review
- Features subscription-free TV Guide On-Screen™ EPG for TV/Cable channel access and recording
- Accepts VCR Plus+ commands for digital recording
- Outputs HD,SD, and upscaled analog video to Component, DVI, RGB, or dual Video/S-Video ports
- Switches and upscales cable box and other external AV sources from two analog inputs
- Controls IR-format cable box for subscription-based programming
- Shares digital video with specific IEEE-1394 FireWire devices (Page 6)
- Links RS-232 control system communication to external video display when tuner is integrated via Ethernet
- Integrates easily over Ethernet, RS-232, discrete IR and wired IR ports, and included HDV-RC IR remote
- Offers Dolby 5.1 surround sound from optical digital output and two analog variable and fixed-level stereo outputs
- Sets up using front-panel control, easy on-screen menus, and control ports
- Displays closed-captioning text and on-screen channel names
- Mounts in 19" rack with optional RKHD kit
- Includes HDV-RC IR remote and cables for component, DVI, RCA stereo audio, and antenna

Specifications

Physical

Size (WHD):	17.0" [430 mm] x 3.0" [76.7 mm] x 12.8" [326 mm]
Weight:	10.2 lbs [4.6 kg]
Enclosure:	Steel and aluminum with durable silver and black powder coat paint
Mounting:	Shelf or rack-mount with optional RKHD Rack Kit)
Hard Drive:	Internal 120 GB, approx. 12 hours HD, 24-119 hours SD quality video
Tuning Tools:	Gemstar TV Guide On-Screen™ electronic program guide for tuning and recording, and VCR Plus+ command

Front Panel
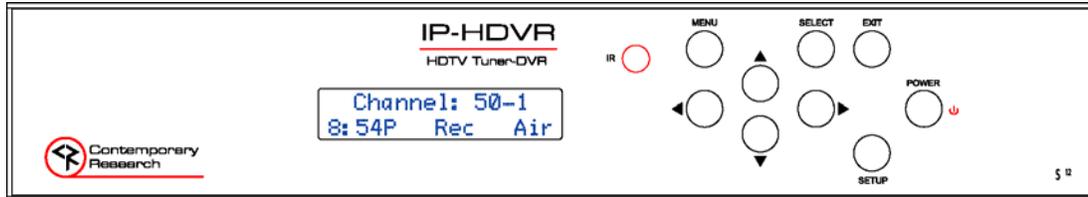
Display:	Blue LCD, 2 lines of 20 characters each
IR:	IR sensor, 57 kHz
Control:	Buttons for Setup, Menu, Select, Exit, and Left, Right, Up, and Down operation

Rear Panel
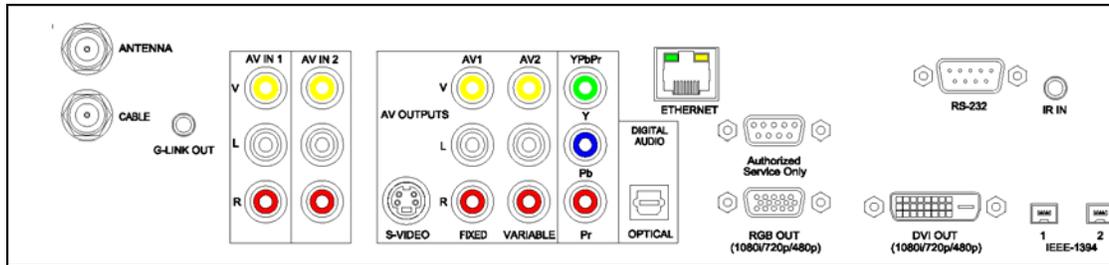
TV In:	'F', female, 75 ohm
Cable In:	'F', female, 75 ohm
Cable IR:	1/8" stereo jack for cable box control
AV 1 In:	3 RCA female jacks, Video, Left, Right - AV source or cable tuner
AV 2 In:	3 RCA female jacks, Video, Left, Right - AV source
S-Video Out:	Mini DIN 4-pin, Y - 1V p-p at 75 ohms, C - 0.286 V p-p at 75 ohms On-screen menu displayed when digital set to 480i
AV 1 Out:	3 RCA female jacks, Video, Variable Left, Right audio
AV 2 Out:	3 RCA female jacks, Video, Fixed Left, Right audio
YPbPr Out:	3 RCA Pr, Pb, Y outputs (1080i/720p/480p/480i)
Digital Audio:	TOSlink optical output, Dolby Digital AC3
Service Port:	DB-9 female RS-232 for factory service and firmware updates
RGB Out:	RGB DB-15 female (1080i/720p/480p)
DVI Out:	DVI-D with HDCP (1080i/720p/480p), HDMI video with optional adapter
IEEE-1394:	2 4-pin data ports, i-Link/1394
Ethernet Control:	10/100baseT RJ-45 jack
Ethernet LEDs:	Right yellow LED indicates 100 baseT speed/10 baseT when off Left green LED indicates link, blinks with data activity
RS-232 Control:	DB-9 male, RS-232 data link to control system, PC, or RS-232 controlled display 300 to 115,200 baud (9600 default), 8 data bits, no parity, 1 stop bit
IR In:	3.5 mm stereo input for external IR sensor or wired IR Discrete codes available
Power In:	AC power cord, 120 VAC, 60 Hz, 35W (not shown above)

Specifications

Video
Frequency Range: NTSC, NTSC and Clear QAM (cable) television 55.25 to 801.25 MHz
TV System: NTSC, ATSC DTV (1080i/720p/480p/480i)
Tuning: Off-air 2-69 and CATV 1-135
Aspect Ratio: Adjustable, variety of modes for widescreen 16:9 and normal 4:3 broadcasts
Captioning: DTV, set by program or customized for size, font and display attributes
                                Analog CC1-CC4, TT1-TT4, On/On with Mute/Off modes
Lock: Parental option for channels and/or rating

IEEE-1394 Devices
Compatible only with makes and models below:

                 Victor HM-DH30000
                 Panasonic NV-DH1, NV-DH2
                 Hitachi DT-DR20000, DT-DRX100
                 Toshiba A-HD2000
                 JVC HM-DH30000U
                 Mitsubishi HV-HD1000
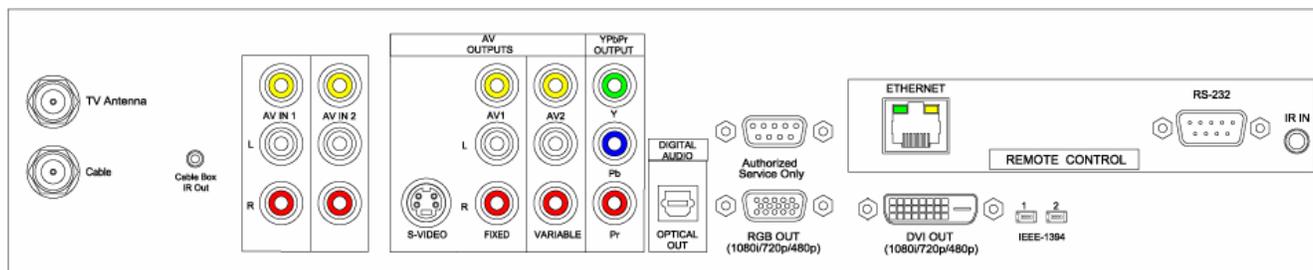   Sony IP-7, IP-55, IP-220

Includes
RF loop cable
RCA composite video audio cable
Stereo RCA cable
Component YPbPr cable
HDV-RC IR Tuner Remote, 2 batteries (AA)

Options
RKHDV Kit for mounting single unit in 19" rack (2RU)
CC-232 RS-232 Cable

AV and Control Connection

RF	
TV Antenna	F connector for off-air MATV signals
Cable	F connector for CATV input
	The IP can receive both at the same time, when the TV Guide is set to receive Cable; the tuner will first search for analog cable channels, then digital off-air broadcasts, and then goes back to cable to search for digital cable broadcasts.
AV Sources	
AV IN 1	RCA composite video, and stereo audio inputs – upscaled to HD output settings, also used for Cable Box AV input
AV IN 2	Composite, S-Video, and stereo audio inputs – upscaled to HD output settings
Cable Box IR Out	1/8" mini jack connects G-Link cable for controlling cable box.
AV Outputs	
AV 1	S-Video and RCA composite video and fixed-level analog audio outputs. Video is switched with HD output, audio is always present
AV 2	RCA composite video and variable-level analog audio outputs. Video is switched with HD output, audio is always present
Digital Outputs	
YPbPr	3 RCA Pr, Pb, Y outputs (1080i/720p/480p/480i)
Optical Audio	TOSlink optical output, Dolby 5.1 or PCM digital audio
RGB	RGB DB-15 female (1080i/720p/480p)
DVI	DVI-D with HDCP (1080i/720p/480p), HDMI video with optional adapter
IEEE-1394	2 4-pin data ports, i-Link/1394
Control	
Service	RS-232 port for factory upgrades only
RS-232	DB-9 male acts as programming and control system port, also acts as pass-through control port to video display, when control system integrated via Ethernet
Ethernet	RJ-45 connection offers bi-directional IP Telnet control and access to Web page
IR In	Input accepts wired IR from control system, external IR-RXC sensor, or ChannelPlus, Audioplex, SpeakerCraft, or Xantech remote IR sensors

Front Panel Setup
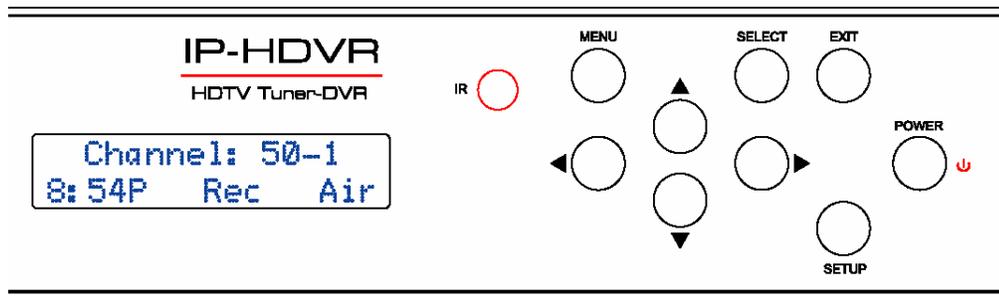
There are a number of parameters that can be set by front-panel Setup commands. In normal operation the Up/Down arrows select channels, and the Left/Right arrows adjust volume.

- Pressing **Setup** enters the setup menus, shows last menu accessed
  (The Menu button accesses on-screen menus)
- Pressing **Up** and **Down** arrow keys steps through the IP-HDVR options
  (Tip: Press Up to access output, Down to jump to IP menus)
- Pressing **Left** and **Right** keys steps through options for each front-panel menu
- Press **Select** to save desired option
- Pressing **Exit** or **Setup** exits the front-panel setup mode

Front Panel Menus

Menu	Parameters	
Output	RGB	
	DVI	
	Component	
	Video	
Format	1080i	
	720p	
	480p	
	480i (Component output only)	
	Variable 1	
	Variable 2	
	Variable 3	
	Native	
	See chart on next page for more information	
Baud	300	9600 (default)
	600	19.2K
	1200	38.4K
	2400	57.6K
	4800	115.2K
Com	8,N,1 (default)	8,M,1
	8,O,1	8,S,1
	8,E,1	7,M,1
	8,N,2	7,S,1
	7,O,1	
	7,E,1	
	7,N,2	
RS-232 CRTL	0=Disable	
	1=Enable (default)	

Menu	Parameters
Unit	1-9
Panel Lockout	None (Default) Ch+Menu Vol+Menu Ch+Vol+Menu Pwr Setup Menu All Setup+Menu Pwr+Set+Menu Cursor buttons active for Setup or Menu modes, Exit returns buttons to current locked or unlocked status
IR Receive	0 - No IR reception 10 - Normal (Default)
Display Line 2	Normal – Time, Air/Cable input, Control Function Lights – represents status LEDs (LA:■RX:■ TX:■ IR ■) Link/Act status, RS-232 RX and TX, and IR In
IP Port	IP port for Telnet communication - Left/Right steps through number positions (blinking cursor position), Up/Down enters number 0-9, Select saves, Exit leaves edits, stays at current menu
Gateway	Quad address – Left/Right steps through number positions (blinking cursor position), Up/Down enters number 0-9, Select saves, Exit leaves edits, stays at current menu
Subnet Mask	Quad address - Left/Right steps through number positions (blinking cursor position), Up/Down enters number 0-9, Select saves, Exit leaves edits, stays at current menu
IP Address	Quad address – Left/Right steps through number positions (blinking cursor position), Up/Down enters number 0-9, Select saves, Exit leaves edits, stays at current menu (192.168.001.231=default, 0.0.0.0 = DHCP)
IP Mode	Selects Static (default) or DHCP IP modes
Firmware	Shows version IP-HDVR V1.5
MAC Add	Shows network MAC address Ex: 0014C8 00 0001 (last 2 bytes is the serial number)

Display Formats

The Display Format setting direct how the IP-HDVR will output the signal in response to different formats in broadcast programming.

Code	Display Format	Broadcast Format	Output As
0	1080i	All	1080i
1	720p	All	720p
2	480p	All	480p
3	480i	All	480i
4	Variable 1	1080i	1080i
		720p	720p
		480p/480i	480p
5	Variable 2	1080i/720p	1080i
		480p/480i	480p
6	Variable 3	1080i/720p	720p
		480p/480i	480p
7	Native	1080i	1080i
		720p	720p
		480p	480p
		480i	480i (YPbPr), 480p (RGB, DVI)

Getting Started

Here's a brief overview of the steps needed to integrate the IP-HDVR.

Front Panel Setup	
	Use Front Panel Setup to select output, format, RS-232 parameters, and/or Ethernet settings.
RF Input	
	- Connect TV Antenna and/or Cable RF feeds. - TV Guide Setup will determine if tuner will search for off-air only or cable analog/digital and off-air digital channels. - After TV Guide Setup (p10), use Channel Menus to search, screen, and test broadcast channel operation. - Use TV Guide Channel Setup (p19) to filter channels displayed in the Program Guide.
Cable Box/AV Input Integration	
	- Connect Cable Box AV output to: - AV IN 1 inputs - Cable input for AV on channel 2, 3, or 4 - Connect G-Link IR cable to Cable Tuner IR Out - Attach IR emitter to underside of cable box, IR emitter below the box's IR sensor - TV Guide Setup will link tuner to input and IR codes for cable box control - If you are not connecting a cable box, both AV inputs can be switched through the tuner
AV Outputs	
	- Connect high-definition display to Component, RGB, or DVI outputs (Use optional adapter to connect an HDMI source to the DVI output) - Connect video display to AV 1 or AV 2 outputs - The IP-HDVR can switch between HD and video outputs (no video is present when an HD video output is selected) - Connect audio equipment to Optical and/or analog outputs – AV 1 is fixed, AV 2 is variable - Audio is always present for all outputs
Control	
	- Connect Ethernet or RS-232 control cable to control system - Use front-panel menus to set IP address or RS-232 parameters - The IP-HDVR can also provide pass-through bidirectional control of a display through the RS-232 control port when the tuner is integrated via the Ethernet port - For IR control, connect external IR sensor or wired IR system control port to IR IN, discrete IR codes are available in AMX, Crestron, and Pronto format
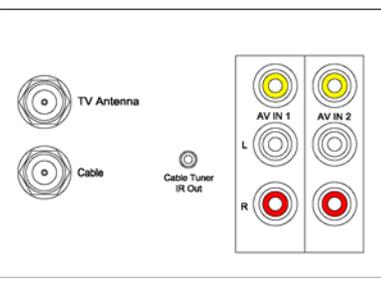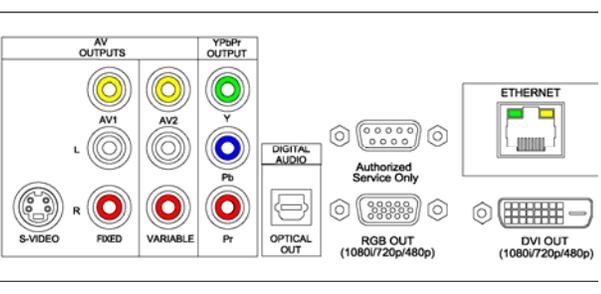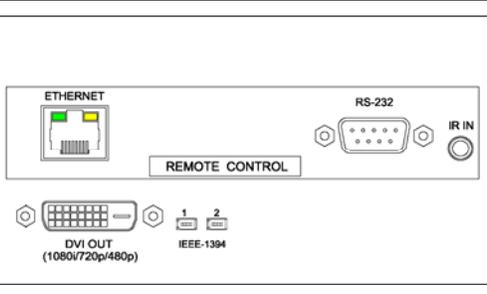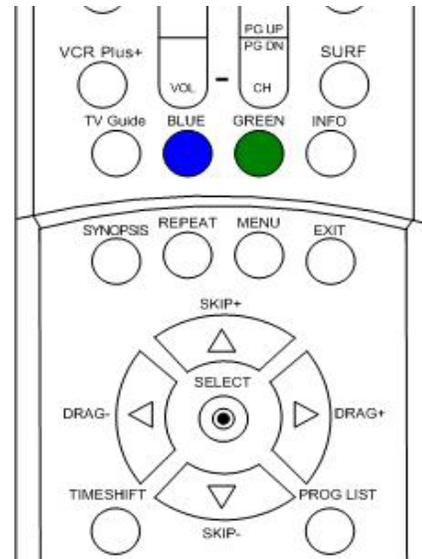
On-Screen Menus   *HDV-RC IR Remote*

The remaining tuner capabilities can be set up by easy-to-use on-screen menus. The menus can be accessed from the HD-RC IR remote control using the Menu, Arrow, Select ( ), Surf, and Exit buttons. You can also use similar buttons on the IP-HDVR front panel.

- **Menu** – Displays the first level of the on-screen menu, step backward from menu levels
- **TV Guide** – Displays the TV Guide On Screen Electronic Program Guide (EPG)
- **Arrows** – Use up/down keys to select main menus, left/right arrow keys to move through sub-menus
- **Select** – Can step forward into sub-menus or confirm an action, the   button in the center of the directional arrows is the same function as Select
- **Surf** – Selects channels for surf list in Edit Channel mode, steps through favorite channels in normal operation
- **Exit** – Exits menu

Analog and Digital Tuning

One of the biggest paradigm shifts in digital TV is how channels are accessed. Gone is the familiar Channel 33. Now you have 33-0, 33-1, 33-2, and so on. In a nutshell, the new tuning options are:

- **Analog Channels.** Entering the number-0 accesses the traditional analog TV channel.
- **Digital Channels.** Entering the same channel-1 tunes the digital equivalent of the analog channel. Note that the digital channel is broadcast on a UHF frequency. Digital tuners see the channel ID (NN-1) in the signal and lists by that name instead of the actual frequency. This way, the broadcasters keep their channel identity, even when analog goes away.
- **Multicast Digital Channels.** Because digital is more compressed than analog, broadcasters are often including additional sub-channels, listed as NN-2, NN-3; up to 6 if the station is only broadcasting SD quality programming.
- **Two-Digit Tuning.** If you are currently watching a digital channel, entering the old channel format, such as 33, will access 33-1. If you are watching an analog channel, entering 33 will take you to 33-0.

TV Guide Setup

It's essential to setup TV Guide when you first install the IP-HDVR. The settings determine how EZ Scan searches for channels. If the Guide is set for off-air, the tuner will not look for cable channels. If you set the Guide for Cable, it will look for analog cable channels (CATV) then digital TV channels (DTV) it will return to the Cable input and search for digital cable channels (DCATV). The following section covers the primary setup screens – there are a number of screens not shown that will be obvious in function.

Country **STEP 1: Identifying Your Location** To supply your DVR with correct program listings, the TV Guide On Screen system needs to know your DVR's location. **Which country is your DVR located in?** USA Canada Using your DVR remote, move up or down to highlight your answer. Press Select to choose.	Press **TV GUIDE**, then **MENU** to enter the top menu bar. Press the **RIGHT ARROW** key to select **SETUP**, then cursor down to Change System Settings. Press **SELECT** to begin setup process. Select USA or Canada.
ZIP **STEP 1: Identifying Your Location** **Please enter the 5-digit ZIP code where your DVR is located:** 8 7 2 0 5 Using your DVR remote, move up, down, left or right to enter your information. Press Select to confirm.	Enter ZIP code. Use **LEFT** and **RIGHT arrows** to position cursor, UP and DOWN to change numbers.
Cable/TV **STEP 2: Configuring for Cable** To supply your DVR with correct program listings, the TV Guide On Screen system needs to know if your DVR receives its signal by cable or antenna. **Do you have cable service connected to this DVR?** Yes No Using your DVR remote, move up or down to highlight your answer. Press Select to choose.	Select Cable or TV-only operation.
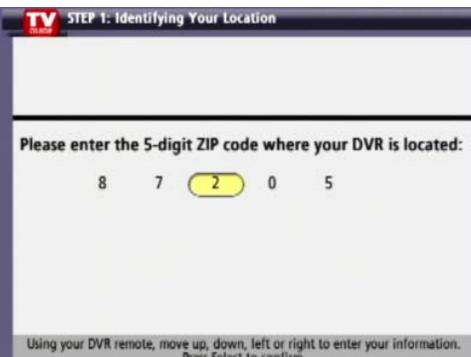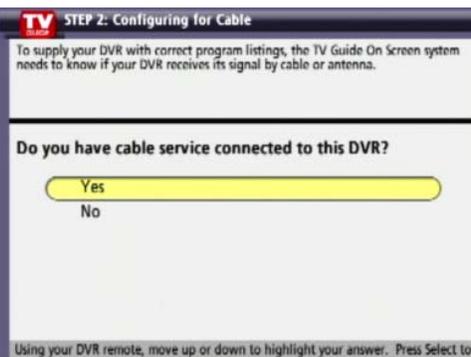
Cable Box *[screen: STEP 2: Configuring for Cable]* To operate properly with your cable box, the TV Guide On Screen system needs to know the channel your DVR is on when using the cable box. The most commonly used output channel is 03. Please consult your cable provider if you are unsure, as an incorrect selection will result in a blue or snowy screen while watching TV. What is your DVR tuned to when using the cable box? Ch 2 Ch 3 Ch 4 A/V1 Using your DVR remote, move up or down to highlight your answer. Press Select to choose.	If you choose Cable, and also indicate that you have an attached cable box, you can define if the video will be sent via channel 2-4 or to the AV 1 input.
Cable Box Code *[screen: STEP 2: Configuring for Cable]* Selecting the correct cable box brand from the list is needed to automatically receive program listings. If you do not know the cable box brand, please consult your cable provider. What brand of cable box is connected to this DVR? Not Listed Archer Cable Cinema Cabletenna Using your DVR remote, move up or down through the list to find your brand (move down for more brands). Press Select to choose.	The next screen will ask for the make of cable box. TV Guide supports 60 brands of cable boxes, a complete list is provided at the end of this manual. There additional screens to try out codes for boxes not listed, and to test control operation.
Confirm *[screen: STEP 4: Confirming Your Settings]* You have entered the following TV Guide On Screen system settings. If any setting is marked INCOMPLETE, you will not be able to use that feature until you complete that portion of TV Guide On Screen system setup. ZIP code - 87505 (USA) Cable - No Are the above settings correct? Yes, everything is correct Yes, but my channel lineup is incorrect No, repeat setup process Using your DVR remote, move up or down to highlight your answer. Press Select to choose.	At the end of the process, you'll have the option of confirming the information, or to redo the operation. You can change TV Guide settings at any time. This screen will appear when you enter TV Guide Setup.
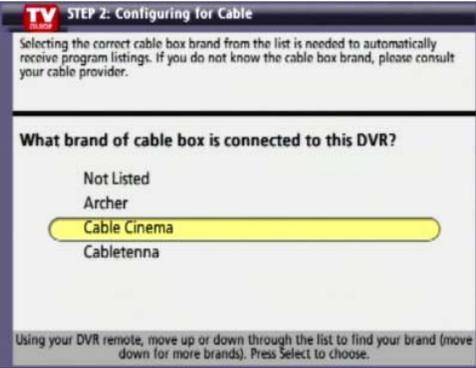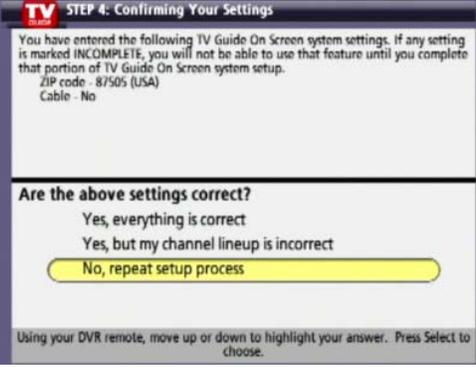
Menu Setup

Channel Menus	
EZ Scan Channels	**Before starting scan, set up TV Guide for off-air or cable operation. To receive both off-air and cable, set TV Guide for cable operation.**
	• Press **MENU** to display the menu window • Press **SELECT** or ▶ to select the EZ Scan menu • Use the **ARROW** keys to select off-air (Antenna) or CATV (cable) format • Press **SELECT** to enter format and begin auto-scanning
	Note that re-scanning channel will erase Favorite Channel and Surf settings. Go to Channel Edit to restore settings.
Edit Channels	The Edit Channel window is useful, easy tool for managing your favorite channels. The active channels (black) on the list will be selected when you send Channel Up and Channel Down commands. The inactive channels can still be selected from direct numeric channel access commands (xx-xx)
	• Select the **Ch Edit** menu • Use the left/right arrows to select a channel group TV (analog TV), CATV (analog cable), DTV (ATSC TV) , CADTV (ATSC cable) • Highlight an active channel (black text) with arrows • The IP-HDVR will display the highlighted channel • Press **SELECT** to remove (dimmed text) or restore a channel to the channel list • Press **SURF** to add to Surf list • Press **MENU** to exit channel editing
DTV Signal	Press to view signal level of the current channel. Same as the Signal IR and RS-232 command. Identical to Signal command on remote or RS-232.
	The Signal icon is real-time, so you can adjust antenna for best reception.

Channel Labels 	Add TV channel logo, used when channel number is displayed or Info button is pressed. Use arrows to navigate icons, press Select to choose icon. Change channels using Channel Up and Down on remote or RS-232 commands.
Input Source 	Select current source: - Digital channel – current digital channel - Analog channel – current digital channel - AV1 input - AV 2 input When you access the menu, the current source on screen will be checked.
Troubleshooting 	This menu accesses an interactive troubleshooting guide for basic tuner problems. For example, selecting "Unable to receive TV Signal" will display an option to re-scan TV channels.
Auto Demo	Plays a stored demonstration video
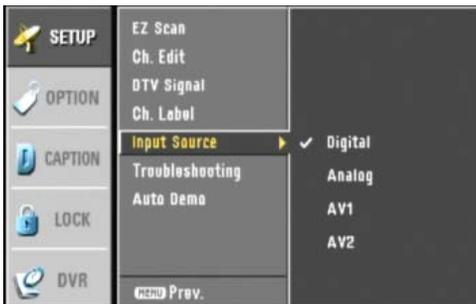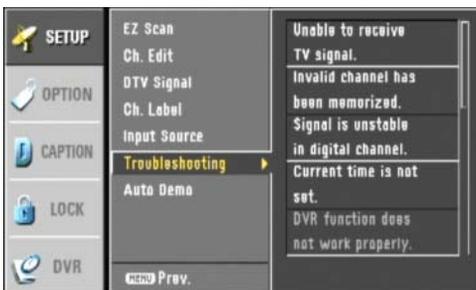
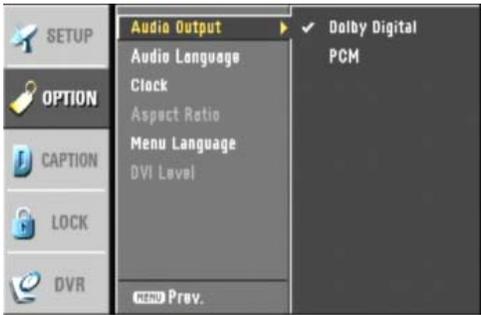| Option Menus	
Audio Output	Selects Dolby digital or PCM digital audio output
Audio Language	Selects English, French or Spanish languages
Clock	Use the Left Arrow button to select the year. TV Guide will insert clock time.
Aspect Ratio	Select to choose the default aspect ratio.
	The Ratio command will rotate through the same options, but the tuner will revert to the default ratio when the channel is changed.
	16:9 Widescreen, 170p, 1080i output Set by Program, Standard, Expansion, Shrink, and Cinema Zoom **4:3 Standard Video, 170p, 1080i output** Set by Program, Normal, Wide, Spectacle, Zoom 1, Zoom 2, and Cinema Zoom (2.35:1) **16:9 Widescreen, 480P, 480i output** Set by Program, Letter Box, Cropped, or Squeezed
Menu Language	English, French, or Spanish
DVI Level	Normal and Expanded (recommended)

Caption Menus	
Caption Type	Select Caption Type: • Off • CC 1-4 • Text 1-4
Caption Options	Select Caption style: • **Style** – Set by Program or Custom • **Size** – Standard (15 pixels), Large (21 pixels), or Small (11 pixels) • **Font** – Select from 8 font styles • **Text Color** – Choose from 8 colors • **Text Opacity –** Solid, Flashing, Translucent, Transparent • **Edge Color –** colors for selected edge type • **Edge Type –** None, Raised, Depressed, Uniform, Left Shadow or Right Shadow • **Background Color** - Choose from 8 colors • **Background Opacity** - Solid, Flashing, Translucent, Transparent
Lock Menus	
	Blocks access to inputs and channels • **Lock System** – Activates parental control • **Set Password** – Enter 4-number password • **Block Channels** – Select specific channels from the channel list • **Movie Rating** – Select one or more ratings for blocking • **TV Rating-Children** – Choose filtering by Age and Fantasy Violence levels • **TV Rating-General** – Choose filtering by Age, Dialog, Language, Sex and Violence • **Aux Block**, Inputs AV 1 and AV 2
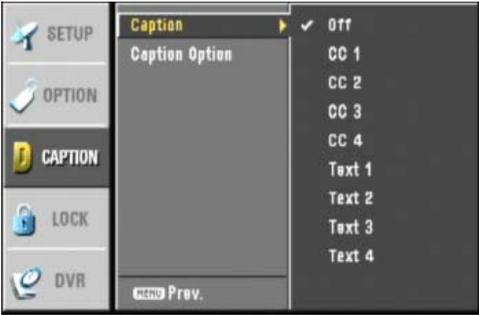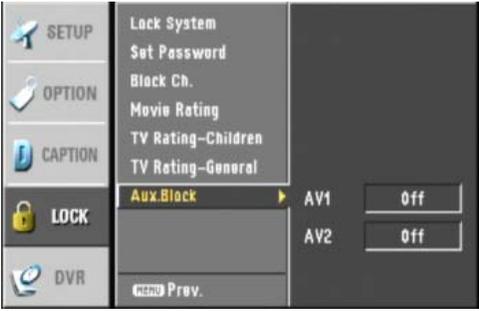
DVR Menus	
Caption Type	Displays the on-screen TV Guide. More information available in the TV Guide System section.
Program List	Displays list of recorded Programs. The graphic list displays a title, file information, and a thumbnail image for each file. • Play • Delete • Title Edit (On-screen keyboard) • Detail (File information) • DVHS Out – record to IEEE-1393 device
HDD Format	Select only if you want to delete all programs from the hard drive.
Record Quality	Preset the recording quality for the DVR from analog broadcasts and AV inputs. Recording quality for digital programs is preset. • Best (24 hours) • High (34 hours) • Medium (64 hours) • Basic (119 hours) • HD digital (21 hours) • SD digital (85 hours) Actual recording hours above vary slightly according to content variables. In addition, the Demo video cannot be erased, so actual HDD space is less than 120 MB. HD broadcasts average about .094 GB per minute, similar to Best; SD recordings use about .024 GB per minute.

DVR Control

Manual Recording	
	• Send the **REC/EDIT** IR or RS-232 command • Press the **UP/DOWN** arrows to set recording from No Limit, 30, 60, 90, 120, 180, or 210 minutes • For No Limit, recording will continue until you send a STOP or HDD is full • Press **REC/EDIT** or **SELECT** to display elapsed time record meter (does not show in recording) – press **EXIT** to clear display
Program List	

	• Send **PROGRAM LIST** to display on on-screen list of titles (also available from the DVR menus)
	• Use the **LEFT/RIGHT** arrow keys to scan through the list
	• Use the **DOWN** arrow keys to display more options for each title, including
	    ○ **PLAY** – play title
	    ○ **DELETE** – delete title
	    ○ **TITLE EDIT** – edit title with on-screen keyboard
	    ○ **DETAIL** – more info, including file size
	    ○ **DVHS OUT** – backup to DVHS

Playback	
Standard Control 	Several control options are available for playback of recorded (and timeshifted) programs. • **PLAY** begins playback • **PAUSE** will pause the playback • **STOP** will exit playback and return to current broadcast • **REW** and **FF** can scan forwards or back from X2 to X300 speeds • Press **PLAY/SLOW** for slow-motion during playback • The **START** and **END** buttons will jump to the start or end of the program • Press **REPEAT** once to set a start point in the playback, then later to set an end point • Section will repeat until you press **END** or **REPEAT** (you can use **REW, FF, SKIP** and **DRAG** to set the points
Smart Control 	• **SKIP FWD** and **BACK** looks at scenes to find transition points, handy for skipping commercials • **DRAG FWD** and **BACK** is a fast way to move through the program – just hold down to jump to a new point. • **SYNOPSIS** is an auto **SKIP** search, stopping briefly at points, then moving on
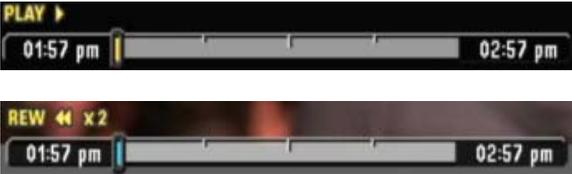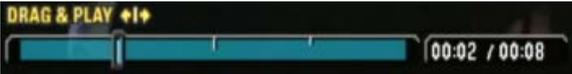
TimeShift	
	This feature gives you the ability to pause a live program for later review. The video is saved in temporary HDD memory, and will continue until HDD is out of space. • Activate the **TIMESHIFT** function. • The program will begin recording in the background • During the session, you can press **TIMESHIFT** again to set a Bookmark (Blue) you can return to during playback, pressing **TIMESHIFT** later on will set a new bookmark (Green) • During playback, press the **BLUE** or **GREEN** buttons to jump to the Bookmarks
Video Clips	

Clip Edit
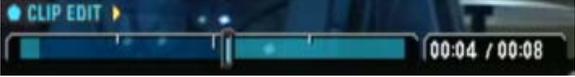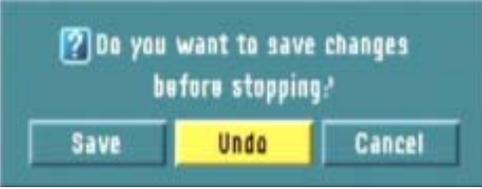 	
	There are two ways you can lift video clips from recorded or **TimeShifted** programming
	
	• During playback of a recorded segment, press **REC/EDIT** to set a start point for a video clip, then press **REC/EDIT** at the end of the section you want to mark.
	• You can use **FF**, **SKIP**, and **DRAG** to move quickly to the next point
	• You can create 10 separate clip points within a given program
	• Press **STOP** to end the clip session
	• Then make one of three responses to the on-screen menu
	    o **Save** the marked clips as separate programs
	    o **Undo** – clip marks are ignored
	    o **Cancel** – cancel all clips and watch program
	
	Only the selected clips are saved, the original, remaining programming is discarded.
	Only use STOP to end session – if you press POWER, the clips may not be saved.
	Clips need to last at least 10 seconds.

Clip Record 	This function is similar, used while a program is being recorded in **TimeShift** mode. • Press **REC/EDIT** during a **TIMESHIFT** session to set clip start and end points • Repeat to set other clip points • Press **STOP** to stop the **TIMESHIFT** and save the clips *The selected clips are saved, the original, remaining programming is saved in temporary TimeShift memory.* *Only use STOP to end session – if you press POWER, the clips may not be saved.* *Clips need to last at least 10 seconds.*

TV Guide Operation

Listings	
Layout	The **TV GUIDE** command displays a graphic channel Guide. You can navigate the listings using your arrow keys. The page is divided into three general sections; **Menu Bar**, **Video/Ad** frame, and **Info** frame. You can access the top **Menu Bar** by pressing MENU, then pressing Right or Left arrow. • **Listings** – show by channel and time • **Sort** – show by category • **Promotions** – display promotions • **Setup** – select setup options • **Messages** – display list of messages • **Schedule** – Favorite and channels set for recording The **Video/Ad** frame on the left displays current channel video at the top and two Features and Ad panes. The **Info** frame shows the details selected by the Menu Bar. You'll notice that channel listings are coded by color: • **Green** – Sports • **Purple** – Movies • **Blue** - Children's • **Teal** - Other The TV Guide channel listings may not presently include all local channels. Some small or independent stations may not be listed in the Guide database, and some stations may not be broadcasting digital program information as yet.

Recording	When a title is selected, you'll see an expanded listing below that includes Station, time slot and program information. The listing also activates three softkey functions.
	
	• **BLUE Button** = Add to Favorite TV Program list
	• **GREEN Button** = Start Recording
	   o **GREEN** cancels recording
	   o **BLUE** select **frequency**
	      ▪ **Once** – this time only
	      ▪ **Regularly**, whenever program appears on the same time and channel
	      ▪ **Weekly** – when it appears on the same day and time
	• **Info Button** = displays full program information
	
	Custom touch panel designs should include similar **BLUE** and **GREEN** softkey icons, as they are used to access for several features in TV Guide.

Schedule – Favorites/Record	
	Select the **Schedule** option on the top menu bar. This displays a list of Favorite programs or those scheduled for recording. Using this tool, you can easily remove programs from the Favorites list, or change the frequency (Once, Regularly, or Weekly). You can also view the list of programs listed for recording, and change the frequency (recording cycle) or delete from the schedule.

Sort	
	The Sort menu simplifies finding programs you want to record. Select Sort from the top menu, move down one step to the Sort menu, and pick: - Alphabetical - Movies - Sports - Children - Educational - News - Variety - Series - HDTV The screen will display a list of programs by sorted by category.

Setup - Channels	
	To screen channels displayed in the TV Guide, go to the Setup option on the top menu, then cursor down and select Change Channel Display. Use the arrow keys to highlight any channel, then use the **GREEN** and **BLUE** keys to remove a channel from viewing in TV Guide.

HDV-RC IR Remote

The HD-RC IR Remote included with the IP-HDVR can be used to setup the tuner and for daily operation. All of the functions on the remote have equivalent commands in RS-232, Ethernet, and Wired IR formats. In addition, the IP-HDVR front panel buttons can perform Power, Channel, Volume, and Menu control.
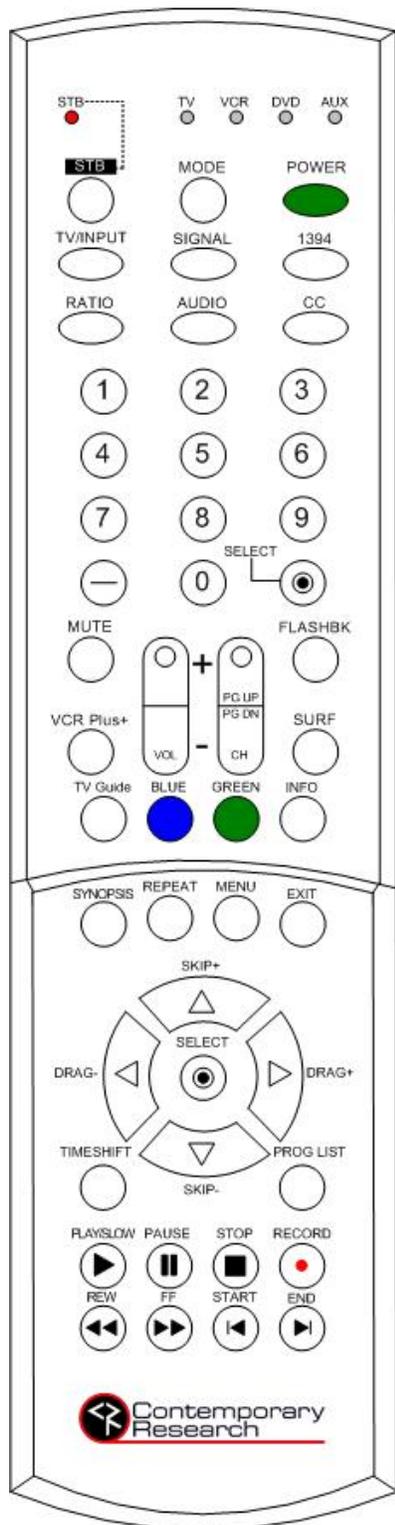
Power
Turns tuner on and off. Discrete on and off IR commands are available as well.

Volume Control
Use the **Vol+**, **Vol-** and **Mute** buttons

Channel Selection
The key change in digital tuning is the need to add a dash (-) and number after the traditional channel number. Analog channels are accessed using XX-0, digital channels using XX-1 (or -2, -3, etc).

Ch+, Ch- and PrevCh can be used to access and recall channels.

The **Surf** button in the Menu section can step through a list of favorite channels.

Menu Operation
Press Menu to access the on-screen menus.

Use the directional **arrows**, **Surf**, **Select** and **Exit** to navigate the menus. The ⊙ button in the center of the directional arrows is the same function as **Select**.

Special Functions
- **CC** steps through available closed-captioning options
- **Audio** selects Mono, Stereo, SAP analog audio output modes
- **Signal** displays an on-screen signal strength meter
- **Ratio** steps through aspect ratios, options depend on channel and output types

Guides
- **Info** launches on-screen information window
- **Station** opens up the Station Guide
- **Date** selects the Date field in Guides
- **Pgm** displays the Program Guide

Ethernet Setup

Ethernet Connection
The IP-HDVR typically communicates over a network using a static IP address, and is shipped set to a default address:

> IP Address: 192.168.1.231
> Subnet Mask: 255.255.255.0
> Gateway Address: 000.000.000.000
>
> Local Port set to 23 (Telnet standard)

Odds are, at least the IP address will change when the IP-HDVR is connected to the client's network. One your first steps will be to obtain a static address from the client's IT department, as well as an external gateway IP address if you intend on supporting the system from your office or anywhere outside the site's firewall.

Once you change the settings, create a label noting the settings and attach to the back of the IP-HDVR.

Reset IP Address
Since its possible another network device is using the default IP address, the best approach is to enter the new settings offline, outside the network. You can use one of two, requiring one of two offline options:

1. Direct PC Connection. Use an Ethernet "Crossover" cable to make a direct connection to the IP-HDVR Ethernet port and your PC. Two pairs of wires are reversed at one end to create a direct send/receive path for data.
2. Hub or Switch Connection. Another approach for connection is to use a standard Ethernet hub or switch between your computer and the IP-HDVR. Using standard Cat5 Ethernet cables, connect your PC to one port, and then connect the IP-HDVR to the second port.

RS-232 and Telnet Terminal Communication
You can communicate with the IP-HDVR with HyperTerminal using an RS-232 or TCP/IP connection to Port 23.

Ethernet and RS-232 Control Protocol

Overview

The IP-HDVR full duplex Ethernet/RS-232 scheme enables a system programmer to control all TV Tuner functions as well as monitor 3 groups of TV Tuner status. All commands are sent as ASCII strings. No delays between characters or commands are required, as data is interrupt driven and buffered.

The 3 status groups are: Channel/Source Select, Audio Levels/Mode and Front Panel. The Mute A/V button-function status from the IP-HDVR front panel has been grouped with the Channel/Source for simplicity in the most common modes of operation. Each of the groups has one ASCII status response string containing all of the status data for that group. The current status string of a group is sent from the IP-HDVR whenever a valid command for that group is received by the IP-HDVR RS-232 port or front panel. A group's status may be requested at any time via the RS-232 port. Status of all 3 groups is sent at power up. The format of each group's status response string remains the same always.

Up to 9 IP-HDVR units may be cabled together and addressed for individual control from a single RS-232 port. Each IP-HDVR is assigned a unique unit code.

Communications parameters (Front Panel Mode 1) are 300 to 9600 baud, 8 data bits, No parity, and 1 stop bit. Factory default is 9600 baud, Unit#1.

All settings are saved to NVRAM in the IP-HDVR.

The tuner will accept non-standard RS-232 control such as voltage that swings from 0 to +5 VDC, commonly found when IR ports are used to send RS-232 commands.

General protocol specifications

Characters in command strings to the IP-HDVR are common ASCII keyboard characters.

Command strings sent to the IP-HDVR begin with the ASCII > (greater than symbol) as an 'Attention' character and end with carriage return - ASCII CR, Hex $0D, or keyboard Enter - as an 'End-of-command' character.

Responses from the IP-HDVR begin with the ASCII < (less than symbol) as an 'Attention' character and end with a carriage return followed by line feed an ASCII LF or Hex $0A as 'End-of-command' characters.

A carriage return is required at the end of each command and is assumed in all examples.

Command String Structure

[Attention] (Unit#) [Command] (Parameters) [Return]

Attention	Single character (>) starts the string
Unit#	The Unit# is expressed as an ASCII 0-9 when used in multiple tuner applications. To address all units, use a Unit # of 0 (Zero) No unit number will default to Unit#1
Command	A two-character command
Parameters	Added attributes to some commands
Return	A carriage return ends the command string, you may use ASCII CR, Hex $0D, or keyboard 'Enter' in programming. For simplicity, the programming examples in the manual will not show the 'CR' – so remember, you'll need to add it in your control code.

Ethernet and RS-232 Protocol

Code	Function	Operation
	Data	
IP=	IP Address	IP returns the current MAC address, current IP address, subnet mask, and gateway. Response example (S or D at end of IP signifies DHCP or Static address): $MAC=0014C8000001 / 1 $IP=192.168.001.231S IG=000.000.000.000 IM=255.255.255.000 IY=1 IP=xxx.xxx.xxx.xxx Defines IP address, then sends status (0.0.0.0 = DHCP)
IG=	IP Gateway	IG Returns current MAC address and IP information IG=xxx.xxx.xxx.xxx Defines IP gateway, then sends status
IM=	**IP Subnet Mask**	IM Returns current MAC address and IP information IM=xxx.xxx.xxx.xxx Defines IP subnet mask, then sends status
IY=	**IP Mode**	IY Returns current mode IY=1 Static (default) IY=2 DHCP
IX=	**Telnet Port**	IX Returns current Telnet port (00023 default) IX=xxxxx Defines Telnet port
	Front Panel	
S4=	Set front panel lockout mode	0 None 1 Ch+Menu 2 Vol+Menu 6 Menu 3 Ch+Vol+Menu 7 All 4 Pwr 8 Setup+Menu 5 Setup 9 Pwr+Set+Menu
Q5=	Set IR Receive mode	0 - No IR reception 10 - Normal (Default)
KK=105	Menu	Opens on-screen menus
KK=106	Arrow Right	Arrow Right
KK=107	Arrow Left	Arrow Left
KK=108	Arrow Up	Arrow Up
KK=109	Arrow Down	Arrow Down
KK=110	Select	Select
KK=111	Exit	Exits menus
KK=89	Help	Displays Menu Help screens
P1	Power On	On
P0	Power Off	Standby, mutes audio and video
PT	Power Off/On	Power toggle
XX	Power On	On (same as 232-series Mute Off)
XM	Power Off	Standby (same as 232-series Mute On)
XT	Power Off/On	Power toggle (same as 232-series Mute Toggle)
	Tuning	

TC=	Select tuned channel	Tunes analog (xxx-0) and digital (xxx-1) channels
		
		Examples: '>TC=28:1' Selects channel 28-1
		               '>TC=28-2' Selects channel 28-2
		               '>TC=32' Selects channel 32-1 (if current
		                         channel is digital)

TU	Tune channel up *Example:* '>3TU'	Selects next higher channel in channel list Bumps Unit#3 tuned channel up
TD	Tune channel down	Selects next lower channel in channel list
TP	Previous channel	Selects previously viewed channel
KK=88	Surf	Selects next channel up in Surf list, cycles to beginning

Ethernet and RS-232 Protocol

Code	Function	Operation
	Display	
KK=82	Ratio	Steps through aspect ratios, options depend on channel and output types
KK=80	Freeze	Freeze image, toggles
KK=81	Signal	Displays an on-screen signal strength meter
KK=115	Closed captions	Steps through captioning options
	Audio	
VU	Ramp volume up	Starts volume ramping up
VD	Ramp volume down	Starts volume ramping down
VX	Volume Mute off	Restores audio volume to previous level
VM	Volume Mute on ***Example:*** '>VM'	Turns off audio outputs Mutes audio outputs
VV	Stop volume ramp	Stops volume ramping
VT	Toggle Volume Mute	Alternates audio mute on and off
KK=85	Audio Mode	Step through audio mode options for mono, stereo, SAP
	Status Request	
SQ	Request Q Mode status	Unit sends "Q" Mode status string
SS	Request Front Panel status	Unit sends "S" Front Panel status string
ST	Request Channel status *Example:* '>ST'	Unit sends "T" Channel/Source status string Returns Channel/Source status response string
SV	Request AV status	Unit sends "V" Audio status string
	RS-232 Control	
R4=	RS-232 Control	0=Disable 1=Enable (default)
R5=	Baud Rate	1=300 6=9600 (default) 2=600 7=19.2K 3=1200 8=38.4 4=2400 9=57.6 5=4800 10=115.2K
R6=	Comm Parameters	0=8,N,1 (default) 11=8,M,1 1=8,0,1 12=8,S,1 2=8,E,1 13=7,M,1 3=8,N,2 14=7,S,1 8=7,0,1 9=7,E,1 10=7,N,2

A carriage return is required at the end of each command and is assumed in all examples. The '=' sign for parameters may be omitted if desired, though it is helpful for clarity in checking programming.

Terminal Communication Commands

EF	Echo Off	Characters received will not be re-transmitted (power up default).
EN	Echo On	Characters received will be re-transmitted. *Example:* '>EN' Characters received will be re-transmitted.
ID	Product ID	Returns the product model number and firmware version.
Z!	Zap	Reconfigures unit for all factory default settings.

HDV-RC Remote Emulation

You can also emulate IR commands sent from the HDV-RC Wireless Remote. If you are using the numeric keys to select a channel, the user or program will need to follow the numeric command with an Enter.
.

KK=<key>	* = Reserved for future products/applications	
	0=*	80=Freeze
	1=Play	81=Signal
	2=Stop	82=Ratio
	3=Pause	83=Format
	4=Rew	84=Angle*
	5=FF	85=Audio
	6=End	86=Subtitle*
	7=Start	87=Bookmark*
	8=Rec	88=Surf
	9=Power (tog)	89=Help*
	10=0	90=TimeShift
	11=1	91=Prog List
	12=2	92=Synopsis
	13=3	99=Dash -
	14=4	100=Info
	15=5	101=FlashBk
	16=6	102=Timer Reset*
	17=7	104=Top Menu*
	18=8	105=Menu
	19=9	106=Cur Rt
	20=	107=Cur Lt
	21=Enter/Select	108=Cur Up
	22=Ch Up	109=Cur Dn
	23=Ch Dn	110=Enter/Select
	24=Vol Up	111=Exit
	25=Vol Dn	112=Top Menu*
	26=Vol Mute (tog)	114=Setup*
	27=Power On	115=CC
	28=Power Off	116=Timer/Info*
	29=Menu	141=Format 1080i
	31=Input	142=Format 720p
	58=Repeat	143=Format 480p
	61=Station*	144=Format 480i
	62=Date*	145=Format Var1
	63=TV Guide	146=Format Var2
	64=ezAdd*	147=Format Var3
	65=1394	148=Format Native
	66=VCR+	149=Output RGB
	67=Blue Button	150=Output DVI
	68=Green Button	151=Output YPbPr
	69=System Power*	152=Output Video
	78=Clear*	
	79=Mode*	

Response Strings

Typical: [Attention] [Unit#] [data ...data] [cr] [lf]

IP-HDVR status response strings contain ASCII characters similar to those used for the same functions in command strings. An ASCII 'carriage return' and 'line feed' follow each response string. Functions shown as NA are not applicable or available in the IP-HDVR; characters will appear in status strings as lower-case x.

Channel/Source Status Response String (T):

Start	#	CMD	Power	Major Channel	Video Mute	Input	RF	NA	Minor Channel	NA	Function
	1-9		U=On M=Off	3 digits	Un-muted	0=Channel 1=AV1 2=AV2	A=Air C=Cable		3 digits		0=None 1=Play 2=Stop 3=Pause 4=FFwd 5=Rew 8=Rec 9=TimeShift
<	1	T	U	032	U	O	A	x	002	x	2

For compatibility with 232-series tuners, 232-ATSC (XXX-XX) channels are split into Channel 1 (Major) and Channel 2 (Minor) sections.

Audio Status Response String (V):

Start	Unit	CMD	Power	Volume 1	Volume Mute	Stereo	Volume 2
	1-9		U=On M=Off	0-63 Emulated level 2 digits	U=Unmuted M=Mute	N/A	0-100 Actual level 3 digits
<	1	V	U	63	U	x	100

Volume 1 emulates 232-series volume level for compatibility with existing applications.
Volume 2 shows actual IP-HDVR level, from 0-100 steps.

Front Panel Mode Status Response String (S):

Start	Unit	CMD	Audio	Tune Mode	Lockout	Bass	Treble	Output	Ratio Current	Ratio Mode	NA
	1-9		N/A	N/A 1 digit	0-9	Fixed 2 digits	Fixed	0=RGB 1=DVI 2=YPbPr 3=Video	0-3 0=1080i 1=720p 2=480p 3=480i	1-7*	4 digits
<	1	S	x	x	1	08	4	1	1	6	xxxx

Current Ratio is the actual output ratio; Ratio Mode is the selected mode (see chart on page 9)

Q Mode Response String (Q):

Start	Unit	CMD	Q0	Q1	Q2	Q3	Q4	Q5	N/A
	1-9		N/A	N/A	N/A	N/A	N/A	IR 0=Off A=Normal	4 digits
<	1	Q	x	x	x	x	x	A	xxxx
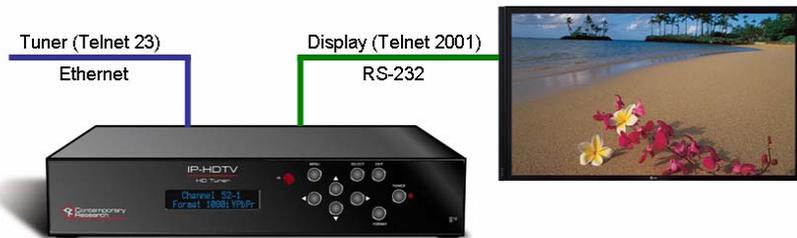
RS-232 Display Control

An IP-HDVR that is controlled over Ethernet can also offer a pathway for IP-driven RS-232 control to a display or projector. This application takes advantage of the fact that multiple Telnet ports can communicate over the same TCP connection.

- Set the control system to communicate with the IP-HDVR over Ethernet through Telnet Port 23, or a different Telnet port you've defined in the IP-HDVR for control.
- Set the control system to control the display over Ethernet using Telnet Port 2001, same IP address as the IP-HDVR.
- The IP-HDVR will pass data to and from the Telnet port 2001 through the RS-232 control port on the back. This connection offers full bi-directional control of the display.
- The RS-232 baud rate can be changed via front-panel settings or programming, presently fixed at 8 data bits, no parity, one stop bit.

TCP and UDP Connectivity

The IP-HDVR can be controlled via TCP or UDP protocols. In most cases, a control system Ethernet port will be set to connect using TCP/IP, which provides direct, two-way communication between the tuner and the control system.

System programmers could opt to use UDP protocol instead, which is useful for simple, one-way control or broadcasting control commands to all IP-HDVR tuners on the LAN. The tuners can send status information back via UDP, but system programming will need to read the strings to interpret which IP address is sending the data. Check with CR Support for more information on this option.

The IP-HDVR can communicate over both UDP and TCP protocols, no special settings or programming is required.

Web Control Page
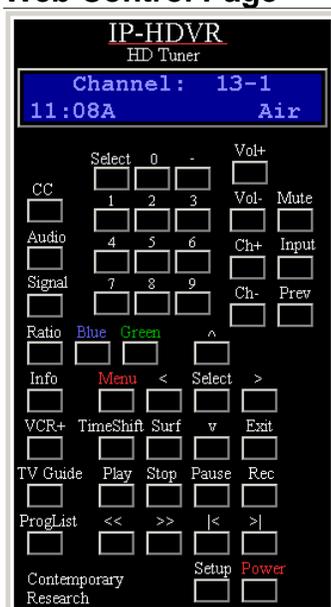
The IP-HDVR features on onboard Web page for remote IP control of the tuner, accessed by entering the IP address of the tuner in a standard Web browser.

Simply click on the Web panel buttons to control the tuner, and the text area at the top will provide system feedback.

RS-232 Cable Connections

Single Tuner

Control Wiring – Single Unit

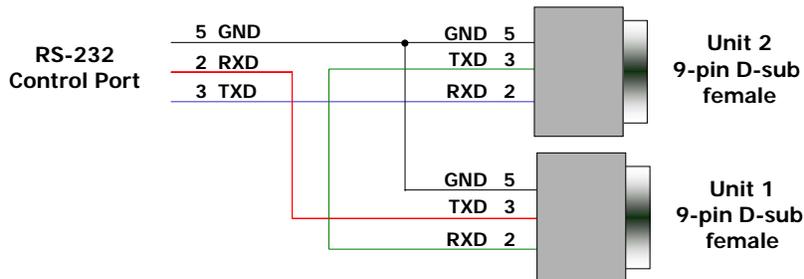| RS-232 Control Port			9-pin D-sub female
5 GND	GND 5		
2 RXD	TXD 3		
3 TXD	RXD 2		
	Channel Up 4		
	Channel Down 9		

RS-232 wiring for control or programming should only use pins 2, 3, 5. Cables with all pins wired can lock out front-panel programming and data communication (Pins 4 and 9 are inputs).
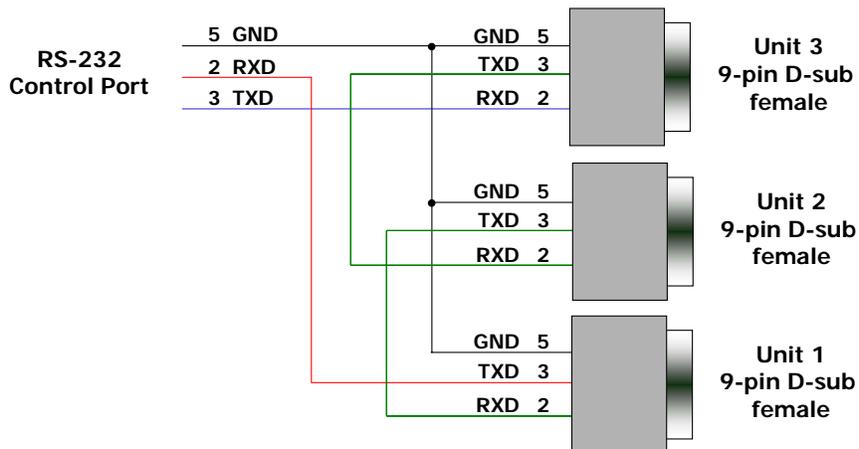
Multiple Tuners

Up to nine tuners can be daisy-chained from one RS-232 control port. Remember that you will need to use the Unit# address in your programming when you control more than one tuner from the same control port.

Set the first unit in the RS-232 chain to the highest Unit#, then wire in sequence to the last tuner in the chain. The reason for this is that CR tuners use an intelligent data bus - the highest number tuner receives all commands, and then passes on commands addressed to tuners with lower unit numbers. The next tuner in the chain does the same, and so on until the last unit.

RS-232 Wiring – Two Units

RS-232 Control Port
5 GND
2 RXD
3 TXD

GND 5 / TXD 3 / RXD 2 — Unit 2 9-pin D-sub female

GND 5 / TXD 3 / RXD 2 — Unit 1 9-pin D-sub female

RS-232 Wiring – Three Units

RS-232 Control Port
5 GND
2 RXD
3 TXD

GND 5 / TXD 3 / RXD 2 — Unit 3 9-pin D-sub female

GND 5 / TXD 3 / RXD 2 — Unit 2 9-pin D-sub female

GND 5 / TXD 3 / RXD 2 — Unit 1 9-pin D-sub female
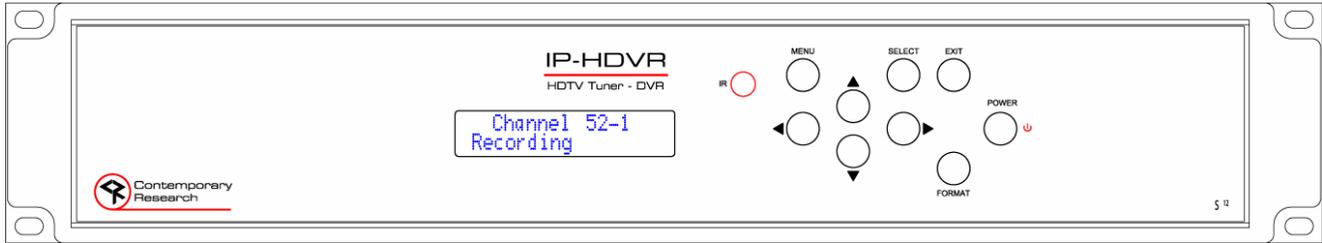
Rack Mounting

RKHDVR HD Rack Kit

- Attach IP-HDVR to RKHDVR shelf
- Mount RKHD into 19″ equipment rack
- Place cover plate into the RKHD front, attach with 2 mounting screws

Dimensions:	19" [487mm] wide x 3.4" [86mm] high (2RU) x 11″ [279mm] deep
Weight:	10 oz [284g]
Enclosure:	All aluminum with durable black powder coat paint
Hardware:	Qty 4 CS, Phillip, Flathead, 82deg, Black, 8-32 x .25″

Cable Box Codes

The following makes of cable box codes can be selected in the TV Guide Setup Screen

Archer	Macom	Regal
Cable Cinema	Maestro	Regency
Cabletenna	Magnavox	Rembrandt
CableView	Matsushita	Samsung
Centurion	Motorola	Scientific-Atlanta
Century	Movietime	Sheritech
Citizen	NEC	Signal
Clearview	Next Level	Sony
Curtis	NovaPlex	Sprucer
Diamond	NovaVision	Standard Components
Drake	NSC	Stargare
Eagle	Oak	Sylvania
Eastern	Oak Sigma	Teknika
Echostar	Optimus	Telecaption
Explorer	Panasonic	Teleview
GC Electronics	Philips	Texscan
Gemini	Pioneer	Tocom
GE	ProScan DSS	Toshiba
General Instruments	Prime Star	Uniden
Gerrard	Pulser	Unika
Hamlin	Quest	Universal
Hitachi	Radio Shack	Videoway
Hughes	RCA	Vidtek
Jasco	Realistic	Viewstar
Jerrold	Recoton	Zenith

IP-HDVR FAQ

Can we daisy-chain RS-232 control as we do with 232-series CR tuners?

Yes. Up to nine IP-HDVR, 232-STS, 232-STA, and 232-MTA tuners are controllable from a single RS-232 control port. A command addressed to devices 1-9 will operate a specific tuner, all tuners will respond to command sent to device 0.

Can the IP-HDVR be used as an HD video server?

No, but it's a very common request. The internal drive records TV channels or AV input video so users can watch programs at their leisure. Content-protection technology prevents external sharing of files to and from the internal drive.

How does the unit schedule channel recording?

The IP-HDTV uses the built-in TV Guide EPG to schedule TV program recording. You can record video from the AV inputs, but this must be done manually.

How many hours of programming can be stored on the internal drive?

Recordings from analog broadcasts average 24-64 hours, depending on IP-HDTV quality settings. Digital recording is preset, typically 21 hours for HD, 85 hours for SD. See page 18 for more information.

TV Guide FAQ

Why aren't all my channels initially displayed?

There are two possibilities:

During initial setup and search the TV Guide On Screen system scans for video on each channel. If the video is detected and the channel is included in the lineup information the channel should be displayed. If not:

- The cable company has not yet informed industry sources of channel line-up changes. Use the "CHANNEL EDITOR" feature to make adjustments.
- The channel is not included in the TV Guide On Screen listings data. Local and Public access channels are examples of the type of stations that may not be listed in the TV Guide on Screen system.

Why do *all* my channels display "No Listing?"

There are two possibilities:

- There has been a loss of power either from a power failure or an unplugged TV.
- The TV Guide On Screen system has not yet received its first listings transmission (leave TV Guide On Screen device OFF over-night).

In either case, the phrase "No Listings" will be replaced with program information during the next host download cycle. Downloads will occur within the next 24 hour period.

Why do *some* of my channels display "No Listing?"

Answer: Possibilities include:

- The channels in question were recently turned ON (in the "CHANNEL EDITOR" screen) and TV Guide On Screen has yet to receive its first listings transmission.
- After completing the initial set-up, the first listings transmission of the day was interrupted by powering the device ON.
- After completing the initial set-up, the first listings transmission of the day was interrupted by a scheduled recording.
- The device TV Guide On Screen is built in to was left powered ON for an extended period of time and the TV Guide On Screen system was unable to receive program listings during normal host transmission cycles.
- During the first listings transmission, the primary host station used to deliver the TV Guide On Screen signal was down or off line for part or all of the day.
- Poor reception on the host station caused some of the data to be missed.
- The cable box was turned OFF. Remember: The television must be OFF and the cable box must remain ON.

How long are host transmissions?

Answer: TV Guide On Screen data transmissions typically last a few hours. The TV Guide On Screen system only requires one transmission per day to maintain up-to-date program listings. Because the device hosting TV Guide On Screen must be powered off in order to receive new information, several transmissions are scheduled during the course of the day and night.

How often do host transmissions take place?

Answer: Updated program information usually can be received by the TV Guide On Screen system multiple times a day. Set-up information is transmitted 24 hours a day, 7 days a week.

How do I add, delete or change the assigned number of channels on the TV Guide On Screen system?

Answer: Use the "CHANNEL EDITOR" to make adjustments.

Can I move my favorite stations to the top of the TV Guide On Screen LISTINGS display?

Answer: Yes. Use the "CHANNEL EDITOR" to make adjustments.

Why do some days display "No Listing" on all my channels?

Answer: After initial setup it may take a few days for all 8 days of listings to be displayed. This is because the amount of time it takes to transmit listings information for all of the channels in your area may exceed the amount of time allotted for the download. To accommodate this the listings information is broadcast in an order which cumulatively loads all 8 days of the TV Guide On Screen system.

Why are some of my broadcast or cable channels not listed on the "CHANNEL EDITOR" screen?

Answer: Presently, TV Guide On Screen does not list all channels in any given broadcast area. As a result, channels are selected primarily on a "majority rules" basis. Channels with the highest potential viewership are given top priority. Availability of program listings is another consideration.

Why are some of my channels listed on the wrong number?
Answer: Three possibilities are:
- Initial set-up was done incorrectly. (i.e. The wrong ZIP/postal code or channel map were selected.) On the TV Guide On Screen Main Menu Bar, highlight SETUP and choose "Change system settings".
- The cable company has not yet informed industry sources of channel line-up changes. Use the "CHANNEL EDITOR" feature to make adjustments.
- The user is receiving broadcasts through a modified or boosted antenna system or satellite dish that is not supported by TV Guide On Screen system. Use the "CHANNEL EDITOR" feature to make adjustments.

Why doesn't the program highlighted match up with the video window on my TV screen?
Answer: Five possibilities are:
- Incorrect program listing information was transmitted to the TV Guide On Screen system.
- The station in question made a late change to its scheduled program listing and the TV Guide On Screen system has not yet been updated.
- The user is receiving broadcasts through a modified or boosted antenna system or a satellite dish (not supported by TV Guide On Screen system. Use the Channel Editor feature to make adjustments).
- Initial set-up was done incorrectly. (i.e. The incorrect ZIP or postal code was entered or the incorrect channel line-up was selected.) On the TV Guide On Screen Main Menu Bar, highlight SETUP and choose "Change system settings".
- The video window could be locked.

I get two stations on the same channel, BRAVO in the morning and CSPN2 in the evening. Why is only BRAVO listed?
Answer: Channels like these are called "Split" channels. When a "Split" channel occurs only one channel is usually displayed by default. However, if the user wishes to have both channels displayed this can be accomplished through the "CHANNEL EDITOR" mode.

Why was that movie listed as a three star (***) movie? Who provides these ratings?
Answer: All listing information, including movie ratings, is provided by TV Guide editorial services.

Other tips and information on TV Guide On Screen operation are available at www.vgi.com.

Safety Instructions

Read before operating equipment.

1. Cleaning - Unplug this product from the wall outlet before cleaning. Do not use liquid cleaners or aerosol cleaners. Use a damp cloth for cleaning.

2. Power Sources - Use supplied or equivalent UL/CSA approved low voltage DC plug-in transformer.

3. Outdoor Antenna Grounding - If you connect an outside antenna or cable system to the product, be sure the antenna or cable system is grounded so as to provide some protection against voltage surges and built-up static charges. Section 810 of the National Electrical Code, ANSI/NFPA No. 70, provides information with respect to proper grounding of the mast and supporting structure, grounding of the lead-in wire to an antenna discharge unit, size of grounding conductors, location of antenna discharge unit, connection to grounding electrodes, and requirements for the grounding electrode.

4. Lightning - Avoid installation or reconfiguration of wiring during lightning activity.

Power Lines - Do not locate an outside antenna system near overhead power lines or other electric light or power circuits or where it can fall into such power lines or circuits. When installing an outside antenna system, refrain from touching such power lines or circuits, as contact with them might be fatal.

5. Overloading - Do not overload wall outlets and extension cords as this can result in a risk of fire or electric shock.

6. Object and Liquid Entry - Never push objects of any kind into this product through openings as they may touch dangerous voltage points or short out parts, resulting in a fire or electric shock. Never spill liquid of any kind on the product.

7. Servicing - Do not attempt to service this product yourself as opening or removing covers may expose you to dangerous voltage or other hazards. Refer all servicing to qualified service personnel.

8. Damage Requiring Service - Unplug this product from the wall outlet and refer servicing to qualified service personnel under the following conditions:
   - When the power supply cord or plug is damaged.
   - If liquid spills or objects fall into the product.
   - If the product is exposed to rain or water.
   - If the product does not operate normally by following the operating instructions. Adjust only those controls that are covered by the operating instructions. An improper adjustment of other controls may result in damage and will often require extensive work by a qualified technician to restore the product to its normal operation.
   - If the video product is dropped or the cabinet is damaged.
   - When the video product exhibits a distinct change in performance, this indicates a need for service.

* Note to CATV system installer: This reminder is provided to call CATV system installer's attention to Article 820-40 of the National Electrical Code (Section 54 of Canadian Electrical Code, Part I), that provides guidelines for proper grounding and, in particular, specifies that the cable ground shall be connected to the grounding system of the building as close to the point of cable entry as possible.

Limited Warranty

Contemporary Research Corporation (CR) warrants this product to be free from defects in material and workmanship under normal use for a period of two years from the date of purchase from CR. Should such a defect occur CR will repair or replace, at their option, the defective product at no cost for parts or labor.

This warranty extends to product purchased directly from CR or an Authorized CR Dealer. Consumers should inquire from selling dealer as to the nature and extent of the dealer's warranty, if any.

All warranty claims must be shipped pre-paid to the factory. Call or fax to obtain a Return Material Authorization (RMA) number.

CR is not liable for any damages caused by any of its products or for the failure of any products to perform, including any lost profits, lost savings, incidental damages, or consequential damages. CR is not responsible for any claim made by a third party or made for you by a third party. This limitation of liability applies whether damages are sought, or a claim is made, under this warranty or as a tort claim (including negligence and strict product liability), a contract claim, or any other claim. This limitation of liability cannot be waived or amended by any person. This limitation of liability will be effective even if CR or an authorized representative of CR has been advised of the possibility of any such damages.

Some states do not allow a limitation of how long an implied warranty lasts. Some states do not allow the limitation or exclusion of incidental or consequential damages for consumer products. In such states, the limitation or exclusion of the Limited Warranty may not apply to you. This Limited Warranty gives you specific legal rights. You may also have other rights that may vary from state to state. You are advised to consult applicable state laws for a full determination of your rights.

Except as expressly set forth in this Limited Warranty, CR makes no other warranties, expressed or implied, including any implied warranties of merchantability or fitness for a particular purpose. CR expressly disclaims all warranties not stated in this Limited Warranty. Any implied warranties that may be imposed by law are limited to the terms of this Limited Warranty.